

What is claimed is:

1. Photodynamic therapy equipment for treating lesioned part by using a photosensitive substance, which is activated by a light having a peak intensity of a predetermined range  
5 but is almost not activated by a light having the peak intensity out of the predetermined range, comprising:

an irradiation means irradiating into a body a pulsed light of the wavelength having the potential for activating the photosensitive substance; and

10 a control means controlling the peak intensity of the light irradiated by the irradiation means,

wherein said control means controls the depth in the body, where the photosensitive substance is activated, in the position adjacent to the lesioned part by allowing the  
15 irradiation means to irradiate the light having the high peak intensity in order that the light arriving at the deep-lying lesioned part is to achieve the peak intensity of the predetermined range, and controls not to activate the photosensitive substance in the superficial part of the body  
20 positioned closer to the light irradiation means than the lesioned part.

2. The photodynamic therapy equipment according to claim 1 wherein the control means further controls the repetition  
25 frequency of the light irradiated by the irradiation means.

3. The photodynamic therapy equipment according to claim 1 or claim 2, wherein the light having the high peak intensity has the peak intensity of  $10 \text{ kW/cm}^2$  or more which is below  
30 the threshold value generating the plasma in the surface of the body by the light pulse irradiation, and the repetition frequency is 1 Hz to 1 kHz.

4. The photodynamic therapy equipment according to any of claims 1 to 3, wherein the control means allows the irradiation means to irradiate the light having a low peak intensity lower than the high peak intensity by controlling the peak intensity of the light to the predetermined range at the superficial part, when the lesioned part located in the superficial part is treated.

10 5. The photodynamic therapy equipment according to any of claims 1 to 4 comprising further a detection means detecting at least one of an amount of the photosensitive substance accumulated in the lesioned part and oxygen concentration of the lesioned part.

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6. The photodynamic therapy equipment according to any of claims 1 to 5, wherein the light is selected from the group consisting of light generated from optical parametric oscillator, semiconductor laser beam, dye laser radiation 20 and second harmonic waves of variable wavelength near-infrared laser beam.

7. The photodynamic therapy equipment according to any of claims 1 to 6 comprising further a catheter inserting into 25 the position adjacent to the lesioned part in the body and guiding the light irradiation means to the position adjacent to the lesioned part by a guidance of the catheter.

8. The photodynamic therapy equipment according to claims 30 7 wherein the catheter is a vascular balloon catheter.

9. The photodynamic therapy equipment according to claims

7 wherein the catheter is an urethral catheter.

10. The photodynamic therapy equipment according to any of  
claims 1 to 9 wherein the control means controls the depth  
5 in the body, where the photosensitive substance is activated,  
by maintaining constantly the total number of pulse of the  
light irradiated from the light irradiation means, and  
controlling the peak intensity of the light.

10 11. The photodynamic therapy equipment according to any of  
claims 1 to 9 wherein the control means controls the depth  
in the body, where the photosensitive substance is activated,  
by keeping the total irradiation energy of the light irradiated  
from the light irradiation means constant, and controlling  
15 the peak intensity of the light.

12. The photodynamic therapy equipment according to any of  
claims 1 to 9 wherein the control means controls the area  
in the body, where the photosensitive substance is activated,  
20 by changing continuously or intermittently the peak intensity  
of the light irradiated from the light irradiation means.

13. A method for controlling the photodynamic therapy  
equipment equipped with an irradiation means irradiating into  
25 a body a pulsed light of the wavelength having the potential  
for activating a photosensitive substance, which is activated  
by a light having a peak intensity of a predetermined range  
but is not activated by a light having the peak intensity  
out of the predetermined range, and a control means controlling  
30 the peak intensity of the light from the irradiation means,  
comprising controlling the depth in the body, where the  
photosensitive substance is activated, in the position

adjacent to the lesioned part by allowing the irradiation means to irradiate the light having the high peak intensity in order that the light arriving at the deep-lying lesioned part is to achieve the peak intensity of the predetermined range, and controlling not to activate the photosensitive substance in the superficial part of the body located closer to the light irradiation means than the lesioned part.

14. The method for controlling the photodynamic therapy equipment according to claim 13 wherein the control means further controls the repetition frequency of the light irradiated from the irradiation means.

15. The method for controlling the photodynamic therapy equipment according to claim 13 or 14 comprising detecting at least one of an amount of the photosensitive substance in the area adjacent to the lesioned part and oxygen concentration of the lesioned part, and controlling the peak intensity of the light irradiated from the irradiation means by the control means based on a result of detection.

16. The method for controlling the photodynamic therapy equipment according to any of claims 13 to 15 comprising allowing the irradiation means to irradiate the light having a low peak intensity lower than the high peak intensity by controlling the peak intensity of the light to the predetermined range at the superficial part, when the lesioned part located in the superficial part is treated.

17. Photodynamic therapy equipment comprising:  
an irradiation means irradiating a pulsed light of the wavelength having the potential for activating the

photosensitive substance, which is activated by the light having a peak intensity of a predetermined range but is almost not activated by the light having the peak intensity out of the predetermined range, and

5        a control means controlling the condition of the irradiation of the light irradiated from the irradiation means,

      wherein the control means controls the activation of the photosensitive substance by changing a irradiation 10 condition of the light, and controls a rate of cell death damaged by an action of the activated photosensitive substance in a direction of the depth in the body.

18. The photodynamic therapy equipment according to claims  
15 17 wherein the irradiation condition of the light includes at least one of the peak intensity, wavelength, total irradiation time, total irradiation energy, pulse width and repetition frequency of the light.

20 19. The photodynamic therapy equipment according to claim 17 wherein the rate of cell death in the direction of the depth in the body is high in a corresponding part of the body and low in a superficial part shallower than the corresponding part.

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20. The photodynamic therapy equipment according to any of claims 17 to 19 wherein the rate of cell death in the direction of the depth in the body is distributed high in a corresponding part of the body and low in the superficial part located 30 shallower than the corresponding part and in the deep part located deeper than the corresponding part.

21. The photodynamic therapy equipment according to claim  
20 wherein the rate of cell death exceeds the cell fatality  
rate, which is impossible to regenerate cells, in the  
corresponding part of the body, and the rate of cell death  
5 is less than the cell fatality rate in the superficial part  
located shallower than the corresponding part and in the deep  
part located deeper than the corresponding part.
22. The photodynamic therapy equipment according to claim  
10 21 wherein the control means controls a range of the cell  
fatality rate in order that the rate of cell death is maintained  
to above the cell fatality rate by controlling the output  
power of the light.
- 15 23. The photodynamic therapy equipment according to claim  
21 wherein the control means controls the range of the cell  
fatality rate by keeping the total number of the irradiation  
pulse of the light irradiated from the light irradiation means  
constant, and controls the range of the cell fatality rate  
20 by controlling the peak intensity of the light.
24. The photodynamic therapy equipment according to claim  
21 wherein the control means controls the range of the cell  
fatality rate by keeping the total irradiation energy of the  
25 light irradiated from the light irradiation means constant,  
and controls the range of the cell fatality rate by controlling  
the peak intensity of the light.
25. The photodynamic therapy equipment according to claim  
30 21 wherein the control means controls the range of the cell  
fatality rate by changing continuously or intermittently the  
peak intensity of the light irradiated by the light irradiation

means.

26. The photodynamic therapy equipment according to any of claims 17 to 25 comprising further a catheter inserted into  
5 the position adjacent to the lesioned part in the body, and guiding the light irradiation means to the position adjacent to the lesioned part by a guidance of the catheter.
27. The photodynamic therapy equipment according to claims  
10 26 wherein the catheter is a vascular balloon catheter.
28. The photodynamic therapy equipment according to claims  
26 wherein the catheter is an urethral catheter.
- 15 29. A method of photodynamic therapy comprising:  
a step administering to a body a photosensitive substance, which is activated by a light having a peak intensity of a predetermined range but is almost not activated by a light having the peak intensity out of the predetermined range;
- 20 a step irradiating into the body a pulsed light of the wavelength having the potential for activating the photosensitive substance accumulated in the deep lesioned part of the body by the administration of the photosensitive substance; and
- 25 a step activating the photosensitive substance in the lesioned part by an action of the light having the peak intensity within the predetermined range by irradiating the light of the high peak intensity when the pulsed light is irradiated, subjecting to damage the lesioned part by an action  
30 of the activated photosensitive substance, simultaneously subjecting not to activate the photosensitive substance in the superficial part shallower than the lesioned part, and

preserving the superficial part.

30. The method of photodynamic therapy according to claim  
29 wherein the photosensitive substance is supplied by the  
5 systemic administration or the local administration to the  
body including the lesioned part in the step of administering  
the photosensitive substance in the body.